

## **CLAIMS**

### **What is claimed is:**

1. In an implantable cardiac stimulation device which paces the atria of a heart on demand at the end of an escape interval in a single-chamber atrial pacing mode, a system that dynamically establishes a maximum pacing rate comprising:
  - a detector that detects an atrial activation of the heart and a far-field R wave of the heart corresponding to the detected atrial activation; and
  - a rate limit circuit that imposes a minimum RA interval on the escape interval.
2. The system of claim 1 wherein the device is a single-chamber atrial pacing device, wherein the R wave is a far field R wave, and wherein the detector includes an atrial sense channel that senses the far field R wave.
3. The system of claim 1 wherein the device is a dual-chamber pacing device having a ventricular sense channel and an atrial sense channel and wherein the detector includes the ventricular sense channel to detect the R wave.
4. The system of claim 1 further comprising a blanking circuit that disables detection by the detector during a blanking interval commencing with detection of the atrial activation and ending prior to detection of the R wave.
5. The system of claim 4 wherein the blanking circuit dynamically varies the blanking interval.

6. The system of claim 4 wherein the blanking interval has a first duration responsive to an intrinsic atrial activation and a second duration responsive to a paced atrial activation.

7. The system of claim 6 wherein the first duration is shorter than the second duration.

8. The system of claim 1 wherein the device includes a refractory circuit that provides a refractory period following detection of the atrial activation and wherein the system further comprises a refractory control that sets a revised refractory period responsive to detection of the far field R wave.

9. The system of claim 1 wherein the rate limit circuit varies the minimum RA interval responsive to pacing rate.

10. The system of claim 1 further comprising a morphology detector that confirms detection of the R wave.

11. The system of claim 1 further comprising a blanking circuit that disables detection by the detector during a blanking period beginning with detection of the R wave and ending after a T wave following the R wave.

12. In a cardiac stimulation device which paces the atria of a heart on demand at the end of an escape interval in a single-chamber atrial pacing mode, a method of dynamically establishing a maximum pacing rate comprising:

- detecting an atrial activation of the heart;
- detecting an R wave of the heart corresponding to the detected atrial activation;
- determining a minimum RA interval; and
- imposing the minimum RA interval on the escape interval.

13. The method of claim 12 wherein the step of detecting an R wave includes sensing the R wave with a ventricular electrode configuration.

14. The method of claim 12 wherein the device is a single-chamber atrial pacing device, wherein the R wave is a far field R wave, and wherein the step of detecting the far field R wave includes sensing with an atrial electrode configuration.

15. The method of claim 12 further comprising blanking detection by the detector during a blanking interval commencing with detection of the atrial activation and ending prior to detection of the R wave.

16. The method of claim 15 further comprising dynamically varying the blanking interval.

17. The method of claim 12 wherein the device includes a refractory circuit that provides a refractory period following detection of the atrial activation and wherein the method further comprises setting a revised refractory period responsive to detecting the R wave.

18. The method of claim 12 wherein determining comprises determining the minimum RA interval based upon pacing rate.

19. In a cardiac stimulation device which paces the atria of a heart on demand at the end of an escape interval in a single-chamber atrial pacing mode, a system for dynamically establishing a minimum pacing rate comprising:

detecting means for detecting an atrial activation of the heart and an R wave of the heart corresponding to the detected atrial activation; and

a rate limit means for imposing a minimum RA interval on the escape interval.

20. The system of claim 19 further comprising blanking means for disabling detection by the detecting means during a blanking interval commencing with detection of the atrial activation and ending prior to detection of the R wave.

21. The system of claim 19 wherein the blanking means comprises means for dynamically varying the blanking interval.

22. The system of claim 19 wherein the blanking interval has a first duration responsive to an intrinsic atrial activation and a second duration responsive to a paced atrial activation.

23. The system of claim 19 and further comprising a refractory circuit that provides a refractory period following detection of the atrial activation and wherein the system further comprises refractory control means for setting a revised refractory period responsive to detection of the R wave.